

THE INVENTION CLAIMED IS:

1. A forced hot air drying unit, comprising:

an elongated housing with an air inlet and an internal cavity, said air inlet open into said internal cavity to allow pressurized air to enter said internal cavity, a plurality of air outlets arranged spaced apart along a length of said internal cavity to allow air to pass from said internal cavity to the exterior of said housing; and

a heater mounted within said internal cavity of said housing.

10 2. The drying unit according to claim 1, wherein said plurality of outlets comprises a plurality of orifices.

3. The drying unit according to claim 1, wherein said heater comprises a solid cartridge heater.

15 4. The drying unit according to claim 1, wherein said heater comprises a heating element and a heat transfer body that includes heater fins, said heat transfer body having a contact surface that is in heat transfer communication with said heating element.

20 5. The drying unit according to claim 4, wherein said internal cavity is partly defined by undulating side walls of said housing that form circuitous air paths with said heater fins.

6. The drying unit according to claim 1, wherein said housing comprises an elongated, substantially hollow body having open ends and two end plates which substantially close said open ends, and said heater comprises an elongated heating element that is mounted to one end plate and
5 extends into said internal cavity.

7. The drying unit according to claim 6, wherein said air inlet comprises a port located through a wall of said body.

10 8. The drying unit according to claim 6, wherein said body comprises a substantially rectangular outside profile along a length thereof.

9. The drying unit according to claim 6, wherein said heater comprises a solid cartridge heater.

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10. The drying unit according to claim 1, wherein said housing includes opposing side walls that in part define said internal cavity, wherein each said side wall comprises sidewall fins extending toward said heater, and said heater comprises heater fins extending toward said side walls, at least
20 one of said heater fins interposed between two adjacent sidewall fins, said sidewall fins and said heater fins together forming circuitous air flow paths on opposite sides of said heater.

11. The drying unit according to claim 10, wherein said plurality of air outlets are arranged in two columns, each column receiving air from one of said circuitous air flow paths.

5 12. The drying unit according to claim 1, wherein said heater is configured to have variable power density to provide a substantially constant air temperature of air exiting said plurality of air outlets along the length of said housing.

10 13. The drying unit according to claim 1,
wherein said housing comprises an elongated, substantially hollow body having open ends and two end plates which substantially close said open ends, wherein said body comprises a substantially rectangular outside profile along a length thereof;

15 wherein said heater comprises an elongated, solid cartridge heating element and a heat transfer body that includes heater fins, said heat transfer body having a contact surface that is in contact with said heating element, wherein said heater is mounted to one end plate and extends into said internal cavity;

20 wherein said hollow body includes opposing side walls that in part define said internal cavity, wherein each said side wall comprises sidewall fins extending toward said heating element, and said heater fins extend toward said side walls, at least one of said heater fins interposed between two adjacent sidewall fins, said sidewall fins and said heater fins together forming
25 circuitous air flow paths on opposite sides of said heater.

14. A forced hot air drying unit for drying inks, paints or other coatings, comprising:

a means for receiving pressurized air;

5 a means for receiving electrical power;

a plurality of drying units that each receive, heat, and disperse said pressurized air;

a means for controlling the flow of said pressurized air passing through said drying units, said controlling means includes an air flow regulator; and

10 a means for controlling the temperature of the air passing through said drying units, said means includes a modulating power electronic temperature controller, wherein said drying units, said means for controlling the flow, and said means for controlling the temperature are located in a single enclosure.

15 15. The drying unit according to claim 14, wherein said inks, paints or other coatings are on a web, and said means for controlling the temperature comprises:

a thermocouple mounted to a thermal conducting slide plate in contact with the web;

20 a thermocouple mounted in a location where the web has already been exposed to the majority of the resident time of the drying unit; and

a thermocouple being capable of attaining the temperature of the web.

16. An air distribution system for a forced hot air drying unit,
25 comprising:

an enclosure;

at least one housing, said housing having an air inlet to allow pressurized air to enter said housing, an internal cavity, and an outlet to allow air to pass from said internal cavity to the exterior of said housing;

5 a heater mounted within said internal cavity of each said housing;

at least one control for influencing the amount of forced air drying; and

wherein said at least one housing and said control are contained within said enclosure.

10 17. The system according to claim 16, wherein said control comprises a heater control for controlling air temperature.

18. The system according to claim 16, wherein said control comprises an air pressure regulator connected to a source of pressurized air
15 and to said air inlet.

19. The system according to claim 16, wherein said at least one housing comprises a plurality of housings, each housing having an air inlet to allow air to enter said housing, an internal cavity, an outlet to allow air to pass
20 from said internal cavity to the exterior of said housing; and a heater is mounted within said internal cavity of each said housing; and said system comprises an air distribution path including a manifold located within said enclosure that is air flow connected to all air inlets of said housings, and a common air inlet open to said manifold and connectable to a source of
25 pressurized air on an outside of said enclosure.

20. The system according to claim 19, comprising a common connector, wherein each heater within each said housing has an energy connection that is connected to said common connector, said common
5 connector being connectable to a source of energy on an outside of said enclosure.

21. The system according to claim 20, wherein said heaters comprise electrical heaters and said common connector comprises an
10 electrical connector.

22. The system according to claim 19, comprising a common connector, wherein each heater within each said housing has an energy connection that is connected to said common connector, said common
15 connector being connectable to a source of energy on an outside of said enclosure; and

wherein said outlets of each said housing comprises a plurality of openings spaced apart along a length of each said housing, wherein said housings are arranged side by side with said pluralities of openings facing a
20 common direction, and wherein said enclosure is configured to place said pluralities of openings adjacent to an object to be dried.